XK-PRO 100™

High Speed Drill System

Operating Instructions

TAVA SURGICAL®
SURGICAL POWER & ACCESSORIES

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Introduction

WARNING

Make sure to read and understand this Instruction Manual thoroughly before using the Tava Surgical® XK-PRO 100™ High Speed Drill System. Do not use this system unless you have training and experience using high-speed surgical instruments.

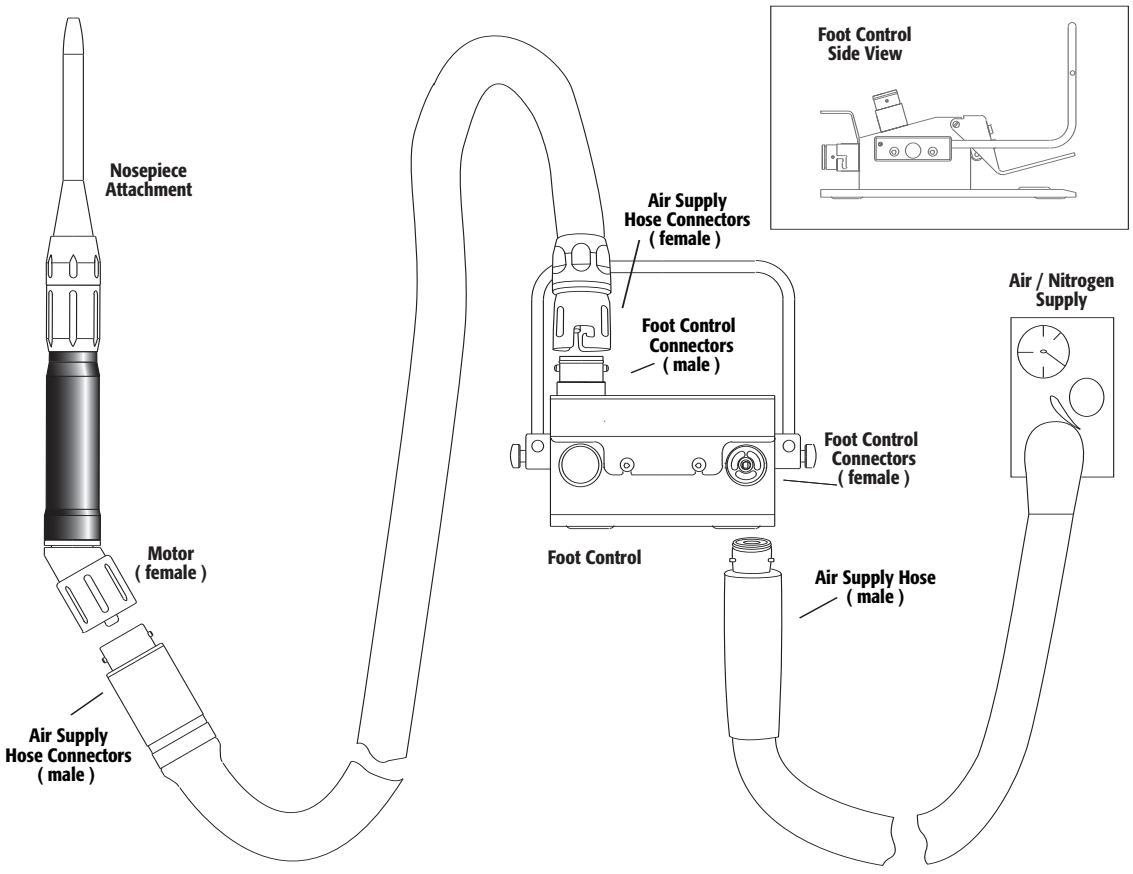
Training

Prior to using the Tava Surgical® XK-PRO 100™ High Speed Drill Motor System it is essential that all individuals who will use or handle the system understand this Instruction Manual and all aspects of using this system.

We recommend that surgeons and hospital staff have in-service training by an authorized Tava Surgical® Representative before using this Drill Motor System.

The surgeon is ultimately responsible for learning and understanding proper XK-PRO 100™ High Speed Drill Motor System use. Failure to do so may cause injury to the patient, hospital staff or surgeon. Extra caution must be observed when using the Drill Motor System around neural and vascular areas.

Setup Illustration



Drill Motor Setup

Quick Connectors

The XK-PRO 100™ is designed with quick-connect components for easy assembly. No special tools or fittings are required to assemble or operate the system.

All hose, foot control and motor connections can be connected only one way. Each fitting has a male **(Fig. 1)** or female **(Fig. 2)** connector.

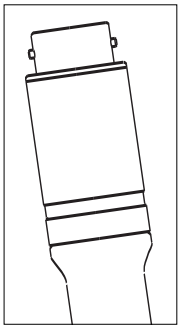


Fig. 1

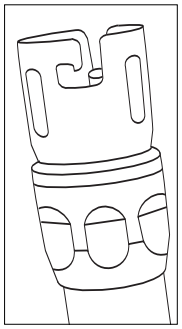


Fig. 2

Fittings are connected by first aligning the pins on the male connector with the slots of the female connector. Slide the pins into the slots and press the two connectors together slightly. Twist the male connector until the pins rotate to the locked position **(Fig. 3)**.

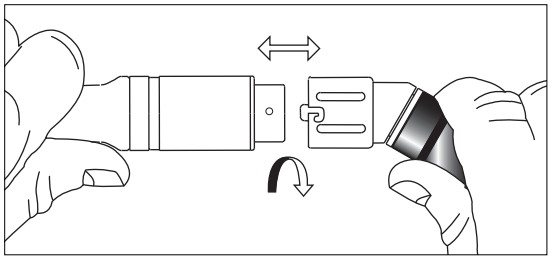


Fig. 3

Motor / Foot Control Connections

Motor Hose to Drill Motor

Connect the motor hose (male) to the drill motor (female) **(Fig. 4)**.

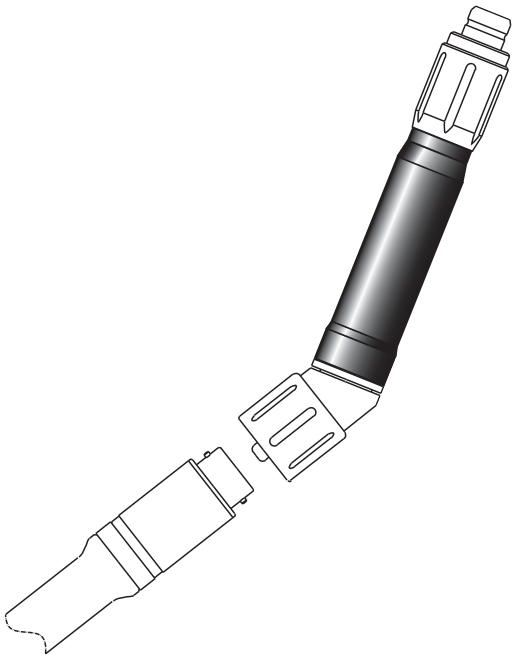


Fig. 4

< Foot Control Connectors >

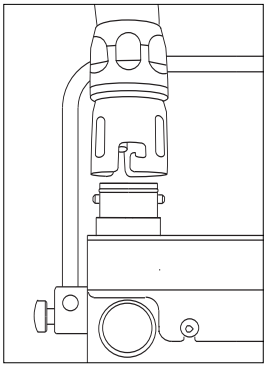


Fig. 5

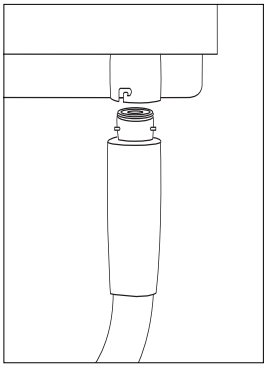


Fig. 6

Motor Hose to Foot Control

Connect the motor hose (female) to the foot control (male) **(Fig. 5)**.

Supply Hose to Foot Control

Connect the supply hose (male) to the foot control (female) **(Fig. 6)**.

Supply Hose to Wall / Tank

Connect the supply hose to the wall / tank nitrogen or sterile air supply (For Schrader use MI-121 and for DISS use MI-121DISS).

Drill Motor Setup

Attachment Installation – Straight & Angled

All attachments lock securely in place without special tools.

Angled Attachment

Before installing the angled attachment, rotate the drill motor's collar to the BUR LOCKED / MOTOR ON position. This is necessary to allow the angled attachment's drive mechanism to engage the motor drive properly.

Both Straight and Angled Attachments

Make sure the collar on the attachment is rotated fully in the open position. Position attachment over the drill motor and push together gently until the attachment is seated fully on the drill motor (Fig. 7). If needed, rotate slightly to seat. Hand tighten the collar to the closed position **(Fig. 8)**.

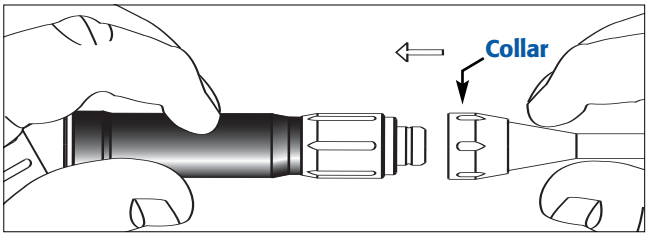


Fig. 7

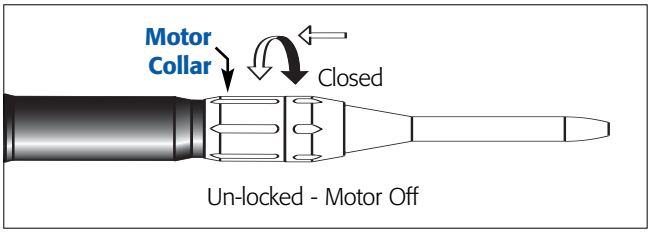


Fig. 8

Cutter Installation – Straight Attachments

For straight attachments, rotate the motor collar to the BUR UNLOCKED / MOTOR OFF position. Insert the cutter through the attachment, into the drill motor and rotate bur until it seats in place. Twist collar to the BUR LOCKED / MOTOR ON position **(Fig. 9)**.

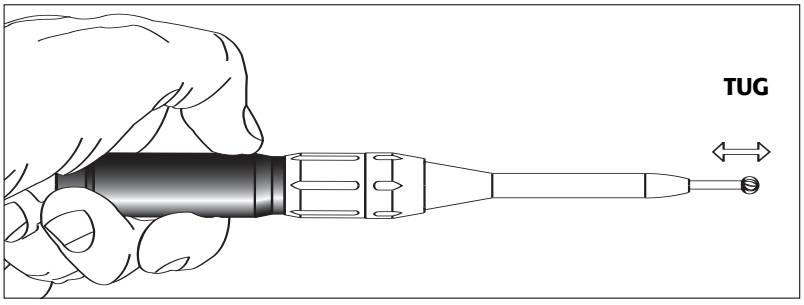


Fig. 9

Important: Tug slightly on bur to ensure it is fully locked in-place.

Drill Motor Setup

Cutter Installation - Angled Attachments

For angled attachments rotate the attachment's collar to the BUR UNLOCKED / MOTOR OFF position. Insert the cutter into the attachment and rotate bur until it seats in place. Twist the attachment collar to the BUR LOCKED / MOTOR ON position. Also, position the motor collar to the BUR LOCKED / MOTOR ON position to unlock the drill motor **(Fig 10)**.

Important: Tug slightly on bur to ensure it is fully locked in place.

Note: When using an angled attachment, the motor collar also must be in the BUR LOCKED / MOTOR ON position in order for the motor to rotate.

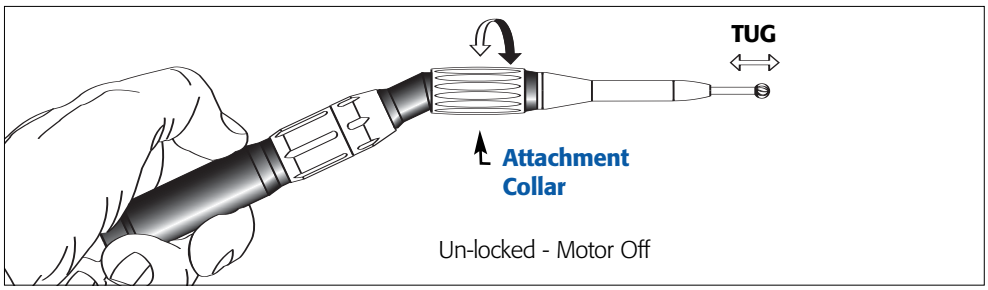


Fig. 10

Craniotome Cutter and Attachment Installation

For Craniotome attachments rotate the motor collar to the BUR UNLOCKED / MOTOR OFF position. Insert the cutter directly into the motor and rotate until it seats in place. Twist collar to the BUR LOCKED / MOTOR ON position **(Fig. 11)**.

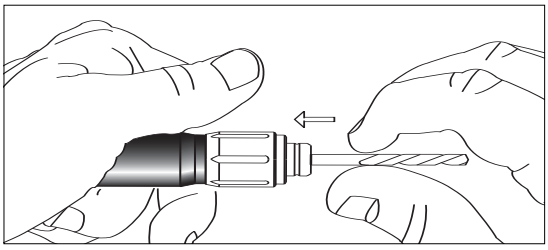
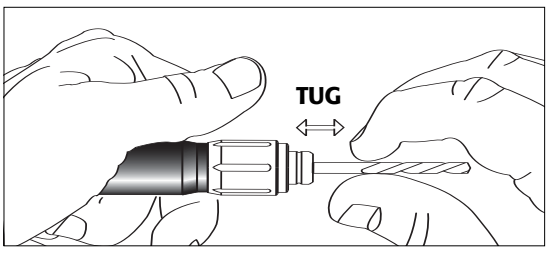


Fig. 11

Important: Tug slightly on cutter to ensure it is fully locked in-place.



Make sure the collar on the craniotome attachment is rotated fully in the open position. Position the corresponding craniotome attachment over the cutter and push together gently until the craniotome attachment is seated securely on the motor. If needed, rotate slightly to seat. Hand tighten the collar clockwise to the closed position **(Fig. 13)**.

Caution: Do not attempt to rotate collar of the drill and / or collar of the attachments into open position while operating the motor.

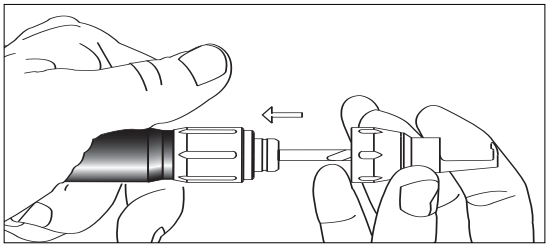


Fig. 13

Attachments

Straight, Angled & Craniotome Attachments

All attachments lock securely into place without special tools.

The nosepiece attachments come in three main groups: Straight, Angled and Craniotomes **(Fig. 14, 15 and 16)**.

There are four sizes each of straight and angled attachments in 50, 70, 90 and 110 mm lengths and two sizes of Craniotomes, 12 and 16 mm.

Install attachments as outlined in the drill motor setup section.

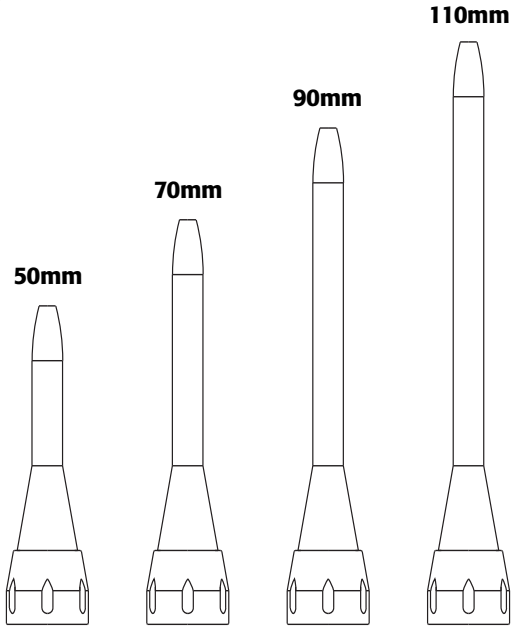


Fig. 14 STRAIGHT ATTACHMENTS

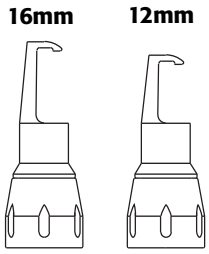


Fig. 16 CRANIOTOME ATTACHMENTS

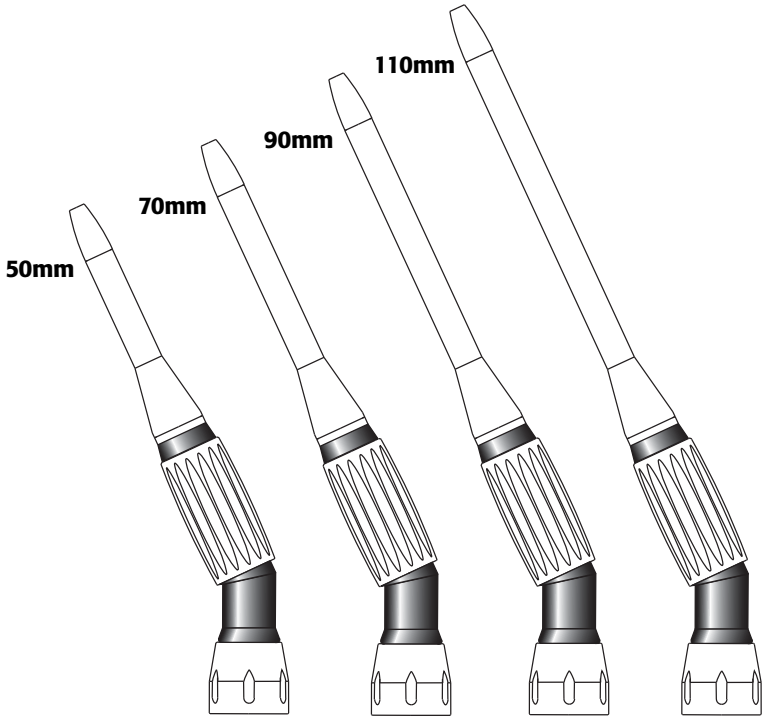


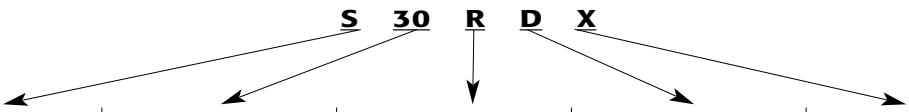
Fig. 15 ANGLED ATTACHMENTS

Cutter Compatibility

Straight & Angled Attachments / Cutters

Each group of nosepiece attachments (Short 50 mm, Medium 70 mm, Long 90 mm, Extra Long 110 mm) is designed to operate with a wide range of dissecting cutters. Straight and angled attachments of 50, 70, 90 and 110 mm lengths must be used with 50, 70, 90, 110 mm length cutters respectively.

Example:
Cutter Item number S30RDX indicates the following:
S = 50 mm attachment
30= 3.0 mm head diameter
R = Round head shape
D = Diamond head type
X = Extra Coarse



Attachment	Head Diameter	Head Shape	Head Type	Coarseness or Grit
S = 50 mm M = 70 mm L = 90 mm X = 110 mm	06 = 0.6 mm 10 = 1.0 mm 20 = 2.0 mm 30 = 3.0 mm 40 = 4.0 mm 50 = 5.0 mm 60 = 6.0 mm 70 = 7.0 mm 90 = 9.0 mm	R = Round M = Match Head A = Acorn PC= Pin Cutter	F = Fluted D = Diamond	F = Fine M = Medium C = Coarse X = Extra Coarse

IMPORTANT: Each length cutter must be used only with the corresponding matching nosepiece attachment.

Craniotome Attachments / Cutters

Each Craniotome attachment must be used only with its corresponding size cutter.

Size	Craniotome Attachment	Craniotome Cutter
Pediatric	XKP-C12	CF12S
Adult	XKP-C16	CF16S

Drill Motor Operation / Recommendations

The motor's high speed enables the operator to cut bone, plastic and metal rapidly. The different lengths of straight and angled nosepiece attachments allow access to different anatomical structures. The range of cutters offered allows for a wide range of procedures.

SPECIFICATIONS

Power	Compressed nitrogen or sterile air
Pressure Supply	120 psi – 130 psi for optimal performance (8.3 - 9.0 Bar)
Drill Motor Speed	100,000 RPM (90,000 to 105,000)
Drill Motor Length	110 mm
Drill Motor Diameter	15.0 mm
Sterilization	Complete system can be washed and autoclaved (See Sterilization Guidelines)

Caution: Never exceed air pressure of 150 psi (10.3 Bar) as this may cause the motor to fail.

Drill Motor Operation

Please note the following operational and safety tips:

1. The drill should be held like a dissector for precise cutting and better fingertip feedback **(Fig. 17).**
2. Always irrigate thoroughly when cutting to avoid bone heating.
3. Cut only what you can see.
4. Never use nosepiece to bend or pry.
5. Always wear safety glasses and protective clothing.
6. Always use appropriate length attachment with chosen bur length.

IMPORTANT

Very light pressure is required on the cutting tips. Do not exert excessive pressure on the cutter tips. The high-speed drill and instruments are designed to do the cutting. Guide the drill with your fingertips using a smooth tapping or circular motion.

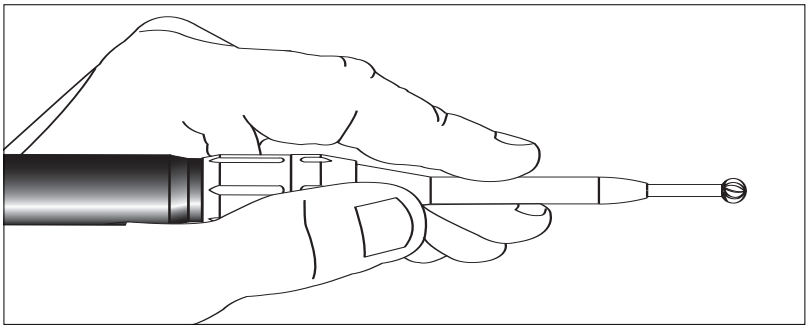


Fig. 17

Drill Motor Operation / Recommendations

Caution:

- Tava Surgical® equipment is designed for use only by medical professionals who are completely familiar with the applicable surgical techniques and instructions for the use of the equipment.
- Prior to each use, all instruments and accessories must be inspected for proper operation.
- To assure safety of the patient and operating personnel, use only Tava Surgical® accessories and attachments.
- Always inspect air hoses prior to use. Worn or damaged hoses should not be used but returned to Tava Surgical® for repair/replacement immediately.
- Never use cleaning solutions on drill motor without hose attached.
  See "**Cleaning, Maintenance & Lubrication**."
- Always lubricate motor before sterilization.
- Always wear safety glasses and protective clothing while operating the motor.
- Do not force cutters. Allow the instrument to do the cutting.
- Do not use attachments for prying or bending.
- Do not use instruments in a site that is not visible.
- Do not activate foot control while manipulating attachments or cutters.
- Undue pressure and insufficient irrigation may cause premature cutter damage and overheat or damage the bone.
- When a bur is locked into drill collet, never operate drill without proper attachment installed.

Cleaning, Maintenance and Lubrication

After each use and prior to sterilization, the drill and all components should be cleaned with a mild, non-abrasive, neutral PH cleaning solution.

Drill Motor

Keep motor hose attached to the motor and clean the motor and hose gently with a mild cleaning solution. Use a small brush to clear all debris. Rinse with fresh water and wipe down with damp cloth.

Apply 1-2 shots of Tava Surgical® aerosol lubricant into the air intake end of the drill motor. Reconnect hose and run drill for 5-10 seconds before sterilizing **(Fig. 18)**. Wipe off excess lubrication.

Important: After each use, be sure to lubricate as mentioned above before sterilization. Failure to do so may damage the motor and void the warranty.

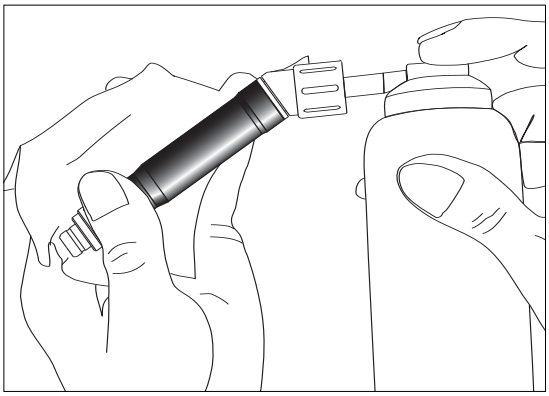


Fig. 18 "Motor"

Nosepiece Attachments

Clean the nosepiece attachments gently with a mild cleaning solution. Rinse with fresh water and clean with pipe cleaner or bottle brush. Remove all debris from attachments, inside and out.

Pipe cleaners or bottle brushes may be used on straight attachments and craniotomes ONLY!

Do not use cotton swabs.

Drill Motor Hose (from foot control to motor)

Rinse with fresh water and wipe down with damp cloth to remove any debris. Sterilize after each use.

Air Hose (from foot control to air supply)

Rinse with fresh water and wipe down with damp cloth to remove any debris. Sterilize after each use.

Foot Control

Rinse with fresh water and wipe down with damp cloth to remove any debris. Sterilize if required, but not recommended.

CAUTION:

Never clean in ultrasonic washer.
Never immerse motor or attachments.

Automatic Washers / Disinfectors

Consult a Tava Surgical® representative prior to placing any Tava Surgical® XK-Pro100™ motor or accessory into an automatic washer or disinfector.

Sterilization Guidelines

The sterilization of devices is ultimately determined by the members of the hospital staff in conjunction with pathology advisors. These suggestions regarding sterilization are only guidelines and may be varied from hospital to hospital, depending upon the type of sterilization equipment and possible pathogens in that particular area.

The following methods of sterilization have been validated for the Tava Surgical® XK-PRO 100™ High Speed Drill Motor, attachments and hoses:

Sterilization Type:	Gravity
Minimum Temperature:	132° C (260.6°F)
Full Cycle Time:	20 Minutes
Minimum Dry Time:	0 Minutes
Configuration:	Wrapped Tray

Sterilization Type:	Gravity
Minimum Temperature:	132° C (260.6°F)
Full Cycle Time:	15 Minutes
Minimum Dry Time:	0 Minutes
Configuration:	Unwrapped Tray

Sterilization Type:	Pre-Vacuum
Precondition Pulses:	3
Minimum Temperature:	132° C (260.6°F)
Full Cycle Time:	4 Minutes
Minimum Dry Time:	0 Minutes
Configuration:	Wrapped Tray

Gas sterilization (Ethylene Oxide) is NOT recommended for the XK-PRO 100™ system and components.

Important: Use deionized water during sterilization to minimize buildup of internal deposits.

Troubleshooting

Symptom	Potential Cause	Solution
Drill motor does not rotate or spins slowly.	Inadequate lubrication.	Lubricate per maintenance requirements. Return for service if needed.
	Low nitrogen / sterile air pressure.	Pressure to be 120 – 130 PSI (8.4 to 9.1 BAR).
	Hose may not be connected properly.	Check connections between motor and foot control and between the foot control and air supply. Check for kinks.
	Worn or damaged components.	Return for service.
High or abnormal vibration.	Damaged or bent bur.	Replace with a new a Tava Surgical™ cutter.
	Wrong attachment / bur combination.	Use proper attachment for selected bur.
	Worn attachment bearings.	Return for service.
	Drill / attachment dropped.	Return for service.
High or abnormal noise.	Inadequate lubrication of drill.	Lubricate per maintenance requirements.
	Damaged or torn air hose.	Order replacement.
	Drill or attachment bearing worn.	Return for service.
Drill motor overheating.	Drill used immediately after steam sterilization.	Allow drill to cool before using.
	Worn / damaged bearings or components.	Return for service.
	Inadequate lubrication.	Lubricate per maintenance requirements.
	Excessive lubrication.	Lubricate per maintenance requirements.
Attachments overheating.	Worn / damaged bearings or components.	Return for service.
Difficulty connecting hoses.	Bent or damaged connectors.	Return for service / replacement.
Cutters will not fit and / or not secure.	Debris in collet assembly.	Clean per maintenance requirements.
	Not Tava Surgical™ cutters.	Replace cutters.
	Damaged collet assembly.	Return for service.
Black surface fading.	Strong or abrasive cleaner used.	Use mild, non-abrasive cleaner.

Components & Accessories

XKP-100A	Drill Motor
XKP-110	Drill Motor Hose (Motor to Foot Control)
MI-121	Air Supply Hose – Schrader
MI-121DISS	Air Supply Hose – DISS
MI-151	Foot Control

NOSEPIECE ATTACHMENTS

XKP-S50S	Straight, Small, 50 mm
XKP-M70S	Straight, Medium, 70 mm
XKP-L90S	Straight, Long, 90 mm
XKP-X110S	Straight, Extra Long, 110 mm
XKP-S50A	Angled, Small, 50 mm
XKP-M70A	Angled, Medium, 70 mm
XKP-L90A	Angled, Long, 90 mm
XKP-X110A	Angled, Extra Long, 110 mm

CRANIOTOMES

XKP-C12	Pediatric, 12 mm
XKP-C16	Adult, 16 mm

ACCESSORIES

MI-191	Aerosol Lubricant
XKP-192	Lubricant Adapter
XKP-188	Sterilization Case
MI-104	Trepan Motor
XKP-111	Trepan Motor Adapter *(Required when using the XKP-110)*

Warranty

Tava Surgical® warrants all XK-PRO 100™ instruments to be free from defects in material and workmanship for a period of one (1) year from the original purchase date. Tava Surgical® air hoses and accessories are warranted for six (6) months from the original purchase date. The warranty is limited to the repair of the product without charge. Burs and saw blades are warranted to be free from defects upon delivery.

This warranty is void in the event of any of the following: Abuse, misuse or use in other than normal surgery environment, disassembly, alteration or unauthorized repair, or in the event that the product has not been used in reasonable manner and in compliance with the written instructions furnished by Tava Surgical®.

The XK-PRO 100™ system and components (motor, attachments, hoses and foot control) can only be returned for repairs.

Repair Service

Tava Surgical® recommends that powered devices be returned for preventive maintance every twelve (12) months, and powered device accessories be returned for preventive maintenance every six (6) months.

Tava Surgical® warrants any service or repair work performed will be free from defects in material or workmanship for the period of 6 (six) months from date of service or repair of XK-PRO 100™ instruments. This warranty applies to the actual work performed.

Please contact your Tava Surgical® Distributor for instructions on returning equipment for repair. When returning equipment for repairs it is the customer's responsibility to decontaminate and sterilize the product.

Upon request, loaner instruments can be supplied, depending on availability of stock. Please contact Tava Surgical® Customer Service at 1-800-535-6638 regarding our loaner policy.

Note: The instruments received from Tava Surgical® or its authorized representatives, new instruments, loaner instruments or instruments returned from service / repair must be sterilized by the facility they are delivered to, prior to use.

To be directed to the appropriate Tava Surgical® Distributor in your country, please contact our US corporate office at +1 912-921-7575.

TAVA SURGICAL®
SURGICAL POWER & ACCESSORIES

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T-2578-09.07-1.2M-PP